ADAPTIVE METHOD AND APPARATUS FOR FORECASTING AND CONTROLLING NEUROLOGICAL DISTURBANCES UNDER A MULTI-LEVEL CONTROL

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Cited documents:

- WO0010455
- GB2336211
- US5995868
- US6018682

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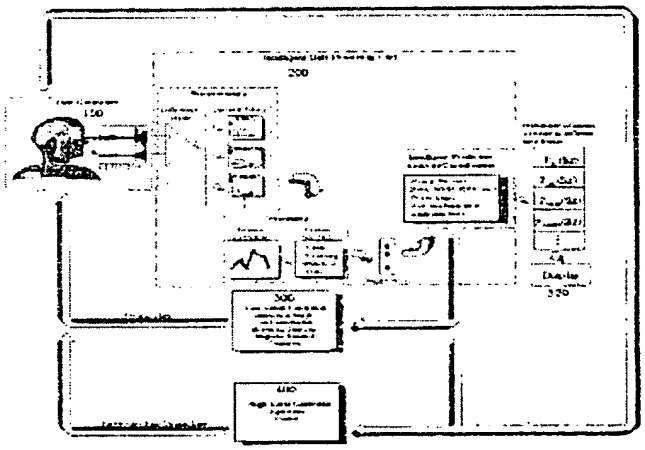
A method and apparatus for forecasting and controlling neurological abnormalities in humans such as seizures or other brain disturbances. The system is based on a multi-level control strategy. Using as inputs one or more types of physiological measures such as brain electrical, chemical or magnetic activity, heart rate, pupil dilation, eye movement, temperature, chemical concentration of certain substances, a feature set is selected off-line from a pre-programmed feature library contained in a high level controller within a supervisory control architecture. This high level controller stores the feature library within a notebook or external PC. The supervisory control also contains a knowledge base that is continuously updated at discrete steps with the feedback information coming from an implantable device where the selected feature set (feature vector) is implemented. This high level controller also establishes the initial system settings (off-line) and subsequent settings (on-line) or tunings through an outer control loop by an intelligent procedure that incorporates knowledge as it arises. The subsequent adaptive settings for the system are determined in conjunction with a low-level controller that resides within the implantable device. The device has the capabilities of forecasting brain disturbances, controlling the disturbances, or both. Forecasting is achieved by indicating the probability of an



oncoming seizure within one or more time frames, which is accomplished through an inner-loop control law and a feedback necessary to prevent or control the neurological event by either electrical, chemical, cognitive, sensory, and/or magnetic stimulation.
